

XIII.—Advanced from the Pacific coast north of the 50th parallel and the morning of the 29th was central north of Washington, with pressure about 29.40. During the 29th and 30th the center moved eastward to the region north of Montana, with high winds over the plateau region to Arizona, and rain on the Pacific coast and over the middle plateau region. During the 31st the center moved southeastward along the eastern slope of the Rocky Mountains, and at the evening report of that date occupied west-central Kansas, with pressure below 29.30. Entering a region over which warm, moist air had been drawn by low area XII which dissipated over the Ohio Valley during the 31st, this low area acquired great energy. In western Texas and New Mexico the wind reached a velocity of 60 to 80 miles per hour on the 31st, and heavy gales and destructive tornadoes and local storms occurred in the evening in Nebraska, Kansas, Indian and Oklahoma Territories, Texas, Arkansas, Missouri, and Iowa.

The tornadoes in Nebraska and Kansas occurred within 300 miles, and generally southeast, of the storm-center. Those noted in Texas were distant nearly 600 miles, and nearly due south, from the center. The tornadoes in Nebraska and Kansas developed in an area running about 300 miles north and south and 200 miles east and west, and occurred between the hours of 5 p. m. and 10 p. m., 75th meridian time. They apparently originated first in the north part of the area between 5 p. m. and 6 p. m., in the south part from 7 p. m. to 8 p. m., and in the east part from 9 p. m. to 10 p. m., 75th meridian time. Those in central Texas appeared about 8 p. m., 75th meridian time. The isobars, isotherms, and wind directions at 8 a. m. and 8 p. m., 75th meridian time, together with the location and direction of movement of the tornadoes are shown on Charts VI and VII.

NORTH ATLANTIC STORMS FOR MARCH, 1892 (pressure in inches and millimeters; wind-force by Beaufort scale).

The paths of storms that appeared over the west part of the north Atlantic Ocean during March, 1892, are shown on Chart I. These paths have been determined from reports of observations by shipmasters received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

In March there is usually an increase of pressure from the Azores over the British Isles, Iceland, and Greenland, the greatest increase occurring over mid-ocean north of the 50th parallel, where it is more than .15. Over the United States and Canada and the Atlantic Ocean between the 20th and 40th parallels the normal pressure is lower than for February, the decrease being most marked over the Canadian Maritime Provinces and along the New England coast, where it is more than .10.

The storms of March have an average velocity of 22 miles per hour, and an average of 1.7 storm traverses the ocean from coast to coast. The storms of this month usually pass from the Nova Scotia or New England coasts to the region northeast of the Grand Banks, where the principal track divides, one branch passing to Iceland and thence to the north coast of Norway. The other branch crosses the ocean to the region west of the British Isles where it divides, one class of storms passing over or north of Scotland, and the other over France or the Bay of Biscay to the Mediterranean Sea. A limited number of storms appear in the Gulf of Mexico and pass thence northeastward to Newfoundland.

In March, 1892, two storms traversed the ocean. One, low area II, advanced from the south Pacific coast over the southern and eastern districts of the United States, developed marked energy after crossing New England, and reached the Bay of Biscay on the 13th. The other, low areas IV and V, probably advanced from the north Pacific Ocean, crossed the United States, and passing thence over the lower Saint Lawrence valley and the Atlantic as a storm of marked strength reached the British Isles on the 15th.

The slow advance of low area I from the middle Atlantic coast to Newfoundland was attended by severe storms west of the 50th meridian during the first seven days of the month. After the 8th this storm disappeared north of the region of observation. From the 1st to the 6th the pressure was low from the Azores to the Bay of Biscay, and by the 7th a severe storm had apparently advanced from that region over the Bay of Biscay and Spain. Low pressure to the south and southwest caused unusually low temperature and frequent snow over the southern parts of the British Isles. In the second decade of the month 2 energetic low areas, numbers V and VII, advanced over the Canadian Maritime Provinces, one of which, number V, reached the British Isles on the 15th. Unsettled weather and heavy gales were experienced over mid-ocean from the 10th to 18th, and low pressure and stormy weather occurred

over the British Isles until the 19th. In the third decade of the month a severe storm, low areas XI and XI α , advanced from the middle Atlantic coast to the region northeast of the Banks of Newfoundland from the 27th to the 29th. This storm occupied mid-ocean until the close of the month. Over and near the British Isles the weather continued generally settled after the 18th.

OCEAN ICE.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for March during the last 11 years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
March, 1882	42 30	50 00	March, 1882	46 30	46 00
March, 1883	41 46	49 48	March, 1883	48 40	43 03
March, 1884	41 20	54 06	March, 1884	45 00	40 15
March, 1885	40 55	49 04	March, 1885	45 57	43 15
March, 1886	40 20	49 02	March, 1886	47 20	44 40
March, 1887	41 00	49 07	March, 1887	45 31	42 56
March, 1888	42 30	50 37	March, 1888	47 23	46 56
March, 1889	44 20	53 00	March, 1889	44 20	53 00
March, 1890	41 01	50 54	March, 1890	46 40	39 50
March, 1891	42 25	50 30	March, 1891	49 00	43 44
March, 1892	43 58	48 15	March, 1892	43 58	48 15
Mean	42 00	50 24	Mean	46 24	44 43

The limits of the region within which icebergs or field ice were reported for March, 1892, are shown on Chart I by ruled shading.

The southernmost and easternmost ice reported, a small iceberg noted on the 27th in the position given in the table, was about 1° north and 3° to 4° west of the average southern and eastern limits of ice for March. The following reports of ice observed show that the quantity of ice noted near Newfoundland and the Grand Banks was largely deficient when compared with ice reported for March during the last 11 years: 1st, iceberg grounded 9 miles east-southeast from Cape Race Light station. 7th, string of field ice, 12 miles in length, east of Cape Race Light station. 11th, 2 bergs 3 miles east of Saint Johns. 22d, heavy pack ice between Pictou, N. S., and Souris, P. E. I. 23d, heavy ice reported in the Gulf of Saint Lawrence. 27th, N. 43° 58', W. 48° 15', a small iceberg.

OCEAN FOG.

The limits of fog belts west of the 40th meridian, as reported by shipmasters, are shown on Chart I by dotted shading. East of the 55th meridian fog was reported on 5 dates; between the 55th and 65th meridians on one date; and west of the 65th meridian on 3 dates. Compared with the corresponding month of the last 4 years the dates of occurrence of fog near the Grand Banks numbered 7 less than the average; between the

55th and 65th meridians 7 less than the average; and west of the 65th meridian 2 less than the average. The fog in the regions referred to and the dense fogs noted at stations of the

Weather Bureau on the middle Atlantic and New England coasts generally attended the approach or passage of general storms.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

Many of the voluntary stations do not have standard thermometers or shelters.

The distribution of mean temperature over the United States and Canada for March, 1892, is exhibited on Chart II by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperature and the departure from the normal are given for regular stations of the Weather Bureau. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the average for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Weather Bureau represents the mean of the maximum and minimum temperatures.

The mean temperature was highest over the south part of the Florida Peninsula and in the lower Rio Grande and lower Colorado valleys, where it was above 65; it was above 50 in middle and southern South Carolina and Georgia, over the middle and south parts of the Gulf States, in southern Arkansas, a greater part of Texas, in southern and western Arizona, and in California, except in the extreme northern part of the state and at mountain stations. The mean temperature was lowest in Saskatchewan and on the extreme north shore of Lake Superior, where it was below 15; it was below 25 along the northern border of the country east of the 105th meridian, and at mountain stations in Colorado; and was below 30 north of a line traced from the middle New England coast over northern Pennsylvania, thence to central Iowa, and thence to southern Alberta.

DEVIATIONS FROM NORMAL TEMPERATURE.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for March for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for March, 1892; (4) the departure of the current month from the normal; (5) and the extreme monthly mean for March during the period of observation and the years of occurrence:

State and station.	(1) Normal for the month of March.	(2) Length of record.	(3) Mean for March, 1892.	(4) Departure from normal.	(5) Extreme monthly mean for March.			
					Highest.	Year.	Lowest.	Year.
<i>Arizona.</i>	°	Years	°	°	°		°	
Fort Apache.....	46.1	20	45.8	- 0.3	53.8	1879	41.3	1875
Fort Mohave.....	53.7	21	64.6	+ 0.9	70.5	1879	58.0	1880
Whipple Barracks.....	45.6	20	44.8	- 0.8	53.8	1879	38.7	1886
<i>Arkansas.</i>								
Lead Hill.....	48.0	10	.....	.....	55.4	1882	45.0	1891
<i>California.</i>								
Fort Bidwell.....	40.3	21	41.6	+ 1.3	49.3	1883	31.2	1874
Riverside.....	56.6	10	56.6	0.0	61.6	1885	52.5	1890
<i>Colorado.</i>								
Las Animas.....	40.5	10	34.8	- 5.7	45.4	1887	33.2	1891
<i>Florida.</i>								
Merritts Island.....	66.1	10	65.0	- 1.1	71.4	1882	61.6	1889
<i>Georgia.</i>								
Forsyth.....	56.6	18	55.7	- 0.9	61.7	1880, 1882	51.4	1885
<i>Idaho.</i>								
Boise Barracks.....	43.2	18	43.4	+ 0.2	49.1	1889	36.8	1882
Fort Sherman.....	38.6	9	.....	.....	43.6	1889	33.2	1882
<i>Illinois.</i>								
Centralia.....	41.1	12	36.0	- 5.1	46.0	1889	35.0	1891
<i>Indiana.</i>								
La Fayette.....	35.8	12	36.2	+ 0.4	41.3	1882	29.6	1885
<i>Indian Territory.</i>								
Fort Supply.....	44.9	13	41.6	- 3.3	52.6	1882	37.4	1876
<i>Iowa.</i>								
Cresco.....	25.1	20	27.8	+ 2.7	42.3	1878	19.6	1888

Deviations from normal temperature—Continued.

State and station.	(1) Normal for the month of March.	(2) Length of record.	(3) Mean for March, 1892.	(4) Departure from normal.	(5) Extreme monthly mean for March.			
					Highest.	Year.	Lowest.	Year.
<i>Kansas.</i>	°	Years	°	°	°		°	
Eureka Ranch.....	40.8	9	35.5	- 5.3	46.0	1889	34.1	1891
Independence.....	44.6	20	41.9	- 2.7	54.1	1878	36.7	1876
Salina.....	40.2	9	38.2	- 2.0	45.0	1889	34.3	1891
<i>Louisiana.</i>								
Grand Coteau.....	61.6	9	57.6	- 4.0	66.2	1884	57.6	1892
<i>Maine.</i>								
Orono.....	27.5	22	28.1	+ 0.6	34.6	1871	19.1	1885
<i>Maryland.</i>								
Cumberland.....	37.0	33	35.7	- 1.3	46.0	1878	30.0	1875
<i>Michigan.</i>								
Kalamazoo.....	31.1	16	32.6	+ 1.5	42.2	1878	22.5	1885
<i>Missouri.</i>								
Sedalia.....	41.7	9	38.3	- 3.4	48.1	1889	36.1	1891
<i>Montana.</i>								
Fort Custer.....	32.7	11	.....	.....	40.8	1889	23.0	1888
<i>Nebraska.</i>								
Fort Robinson.....	34.6	8	31.3	- 3.3	43.0	1889	24.8	1891
Genoa (near).....	32.2	16	32.3	+ 0.1	43.6	1878	23.8	1876
<i>Nevada.</i>								
Browns.....	46.7	20	48.9	+ 2.2	52.8	1879	37.7	1880
Carson City.....	41.4	15	41.6	+ 0.2	50.1	1877	33.5	1880
<i>New Hampshire.</i>								
Hanover.....	27.8	58	28.2	+ 0.4	35.5	1871	19.0	1872, 1875
<i>New Mexico.</i>								
Deming.....	56.5	10	53.4	- 3.1	61.7	1888	51.5	1891
Fort Wingate.....	42.1	21	41.2	- 0.9	51.1	1879	34.3	1886
<i>New York.</i>								
Cooperstown.....	27.4	38	25.0	- 2.4	37.2	1871	18.3	1885
Plattsburgh Barracks.....	26.9	21	23.2	- 3.7	35.0	1871	16.7	1885
<i>North Carolina.</i>								
Lenoir.....	45.4	18	45.2	- 0.2	51.6	1878	35.0	1877
<i>Oklahoma.</i>								
Fort Reno.....	48.2	9	.....	.....	52.8	1887	45.5	1891
Fort Sill.....	51.3	20	47.3	- 4.0	59.3	1879	42.0	1876
<i>Oregon.</i>								
Bandon.....	46.8	8	46.6	- 0.2	50.8	1889	41.5	1886
Eola.....	45.2	22	49.9	+ 4.7	54.2	1884	35.8	1880
<i>Pennsylvania.</i>								
Dyberry.....	28.7	27	26.3	- 2.4	36.9	1878	19.5	1885
Grampian Hills.....	30.5	27	27.0	- 2.9	40.4	1878	20.1	1885
Wellsborough.....	31.0	12	25.2	- 5.8	37.6	1882	22.4	1885
<i>South Carolina.</i>								
Statesburg.....	52.8	11	50.8	- 2.0	59.0	1882	48.3	1885
<i>South Dakota.</i>								
Fort Sully.....	29.1	21	30.8	+ 1.7	44.5	1878	15.9	1876
<i>Texas.</i>								
Austin.....	60.6	20	55.4	- 5.2	66.8	1879	53.0	1872
Silver Falls.....	51.9	6	48.3	- 3.6	56.7	1887	47.7	1891
<i>Utah.</i>								
Terrace.....	42.1	20	45.7	+ 3.6	51.3	1889	28.3	1875
<i>Vermont.</i>								
Stratford.....	26.1	19	24.1	- 2.0	33.8	1878	17.2	1883
<i>Virginia.</i>								
Dale Enterprise.....	41.8	12	37.5	- 4.3	47.1	1880	32.1	1885
<i>Washington.</i>								
Fort Townsend.....	44.5	19	45.6	+ 1.1	50.7	1885	38.7	1880
<i>West Virginia.</i>								
Parkersburg.....	41.7	11	.....	.....	52.8	1882	36.7	1890
<i>Wisconsin.</i>								
Embarrass.....	26.0	20	25.9	- 0.1	42.3	1878	19.2	1872
Madison.....	29.9	27	27.4	- 2.5	37.1	1889	23.2	1888
<i>Wyoming.</i>								
Fort Washakie.....	33.1	9	36.0	+ 2.9	41.0	1887	26.8	1891

DEPARTURES FROM NORMAL TEMPERATURE.

The mean temperature was above the normal in middle and eastern districts north of the 45th parallel, over the middle and northern plateau regions, on the northeast slope of the Rocky Mountains, and along the Pacific coast north of the 40th parallel. The greatest departure above the normal temperature occurred in the Red River of the North Valley, where it was 4 to 6, and the mean was 2, or more, above the normal from the northern part of the Lake region to the north Pacific coast. In districts east of the Rocky Mountains and south of the 45th parallel, over the southern plateau region, and along the middle and south Pacific coasts the mean temperature was below the normal, the most marked departure being noted in